Towards the Characterization of the Darwin Stars

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The ESA mission Darwin will search for the presence of Earth-like planets orbiting nearby stars, study the planet atmospheres, carry out comparative planetology, and analyze potential spectroscopic signatures of life. A deep knowledge of the Darwin stars and of their environment is required by the missions's scientific objectives. Astrophysical information on the Darwin stars have been either collected or estimated by the ESA Terrestrial Exoplanet-Scientific Advisory Team (TE-SAT) by consulting a large number and variety of data sources. However, the existing data do not allow us to characterize in detail the whole sample of stars in the prime target list to the level required by Darwin scientific objectives. Therefore, we have started precursor high resolution spectroscopic observations aiming to a complete characterization of the prime Darwin stars. The main goals are: a) to determine good spectral types and luminosity classes; b) to analyze the stars' kinematics; c) to estimate accurate rotational velocities; d) to quantify the level of chromospheric activity; e) to estimate stellar ages. Up to now, we have obtained spectra of more than 100 Darwin stars for which, to our knowledge, no previous high resolution spectra are available in public sources. All